

This listing of claims will replace all prior versions and listings of claims in the application.

LISTING OF CLAIMS

1. (Currently amended) A fluid sensor for use in an environment having an ambient temperature, the fluid sensor comprising:
 - a) a field-effect transistor (FET) comprising a functionalized semiconductor nano-wire, wherein the functionalized semiconductor nano-wire including at least one catalyst, the catalyst comprising a material capable of interacting with a fluid to be sensed and effecting ~~includes a number of materials that each preferentially interacts with a particular fluid to be detected and effects~~ a change of an electrical characteristic of the FET,
 - b) an integral heater disposed proximate to the field-effect transistor to heat the field-effect transistor to an elevated temperature relative to the ambient temperature, and
 - c) integral thermal insulation disposed to maintain the field-effect transistor at the elevated temperature.
2. (Original) The fluid sensor of claim 1, wherein the functionalized semiconductor nano-wire comprises silicon.
3. (Currently amended) The fluid sensor of claim 2 1, ~~wherein the silicon of~~ the functionalized semiconductor nano-wire is doped to provide a predetermined conductivity type.
- 4 – 5. (Canceled)
6. (Currently amended) The fluid sensor of claim 4 1, wherein the catalyst comprises a metallic catalyst.

7. (Currently amended) The fluid sensor of claim 4 1, wherein the catalyst is a material selected from the list consisting of platinum, palladium, iridium, rhenium, ruthenium, gold, silver, and mixtures or alloys or compounds thereof; carbon; tungsten, titanium, tin, zinc, and oxides thereof; organometallic compounds containing elements from the group consisting of cobalt, iron, and nickel; and transition metal complexes containing elements from Groups IIIA, IVA, VA, VIA, VIIA, VIIIA, IB, IIB of the Periodic Table of Elements.

8. (Currently amended) The fluid sensor of claim 4 1, wherein the catalyst comprises a porous thin layer of catalyst material.

9. (Original) The fluid sensor of claim 8, wherein pores of the porous thin layer of catalyst material extend at least partially through the thin layer of catalyst material.

10. (Currently amended) The fluid sensor of claim 4 1, wherein the catalyst comprises a mesh formed by thin filaments of catalyst material.

11 – 12. (Canceled)

13. (Original) The fluid sensor of claim 1, further comprising a substrate for supporting the field-effect transistor.

14. (Original) The fluid sensor of claim 13, wherein the field-effect transistor and the substrate are formed from a layer of silicon on an insulator (SOI).

15. (Original) The fluid sensor of claim 14, wherein the field-effect transistor and the substrate are formed from a layer of silicon on an insulator layer comprising silicon oxide.

16. (Original) The fluid sensor of claim 13, wherein the integral thermal insulation is disposed on the substrate.

17. (Original) The fluid sensor of claim 13, wherein the integral heater is disposed on the substrate.

18. (Original) The fluid sensor of claim 13, wherein the integral heater is disposed on the integral thermal insulation.

19. (Original) The fluid sensor of claim 13, wherein the field-effect transistor (FET) is disposed on the substrate.

20. (Original) The fluid sensor of claim 13, wherein the field-effect transistor (FET) is disposed on the integral thermal insulation.

21. (Original) The fluid sensor of claim 13, wherein a portion of the substrate is removed to form an opening under the field-effect transistor (FET), the opening being at least partially aligned with the field-effect transistor.

22. (Original) The fluid sensor of claim 13, wherein the substrate serves as a gate for the field-effect transistor.

23. (Original) The fluid sensor of claim 13, wherein the field-effect transistor includes a gate electrically insulated from the substrate.

24. (Original) The fluid sensor of claim 13, wherein the functionalized semiconductor nano-wire comprises a conductive catalyst electrically insulated from the substrate to provide a gate for the field-effect transistor.

25. (Original) The fluid sensor of claim 1, further comprising at least one integral temperature sensor disposed proximate to the field-effect transistor for determining the temperature thereof.

26. (Original) A fluid-sensor array, each fluid sensor of the fluid-sensor array comprising the fluid sensor of claim 25.

27. (Original) A fluid-sensor array, each fluid sensor of the fluid-sensor array comprising the fluid sensor of claim 1.

28. (Original) The fluid-sensor array of claim 27, further comprising at least one integral temperature sensor for determining a temperature thereof.

29. (Original) The fluid-sensor array of claim 27, wherein the field-effect transistor of each fluid sensor of the array is functionalized for detecting a particular substance.

30. (Original) The fluid-sensor array of claim 27, wherein the field-effect transistor of each fluid sensor of the array is functionalized for detecting a distinct substance.

31. (Original) The fluid-sensor array of claim 27, wherein the field-effect transistors of a number of the fluid sensors of the array are functionalized for detecting the same substance.

32. (Original) The fluid-sensor array of claim 27, further comprising at least one field-effect transistor not functionalized for detecting a substance, whereby at least one control device is provided.

33 – 55. (Canceled)

56. (New) A fluid sensor for use in an environment having an ambient temperature, the fluid sensor comprising:

- a) a field-effect transistor (FET) comprising a functionalized semiconductor nano-wire, the functionalized semiconductor nano-wire including at least one coating, the coating including a substance capable of interacting with a fluid to be sensed and effecting a change of an electrical characteristic of the FET,
- b) an integral heater disposed proximate to the field-effect transistor to heat the field-effect transistor to an elevated temperature relative to the ambient temperature, and
- c) integral thermal insulation disposed to maintain the field-effect transistor at the elevated temperature.

57. (New) The fluid sensor of claim 56, wherein the coating comprises at least one dielectric layer of an oxide or a nitride that can be protonated or deprotonated for the detection of protons.

58. (New) The fluid sensor of claim 56, wherein the coating comprises at least one organic species selected from the list consisting of antibodies, antigens, polymers, polynucleic acids, polypeptides, nanoparticles, ion exchange membranes, and combinations thereof.

59. (New) The fluid sensor of claim 56, wherein the coating comprises at least one substance selected from the list consisting of thiols, amines, silanols, alcohols, sugars, Lewis acids, Lewis bases, dipoles, nucleic acids, peptides, and combinations thereof.

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